REMARKS

The Office Action dated April 24, 2001 and the cited references have been carefully considered.

Claims 1-49 are pending. The Applicants hereby affirm the election to prosecute the invention of group I, claims 1-17 and 33-49. Claims 18-32 from further consideration subject to a timely future filing of one or more divisional applications. Claims 50-52 are new and recite subject matter already disclosed in the specification. Claims 5, 14-17, 33-49 are rejected under 35 U.S.C. § 112, first paragraph. Claim 12 is rejected under 35 U.S.C. § 112, second paragraph. Claims 1-2, and 4 are rejected under 35 U.S.C. § 102(b) as being anticipated by Miyoshi et al. (JP 08-311233, hereinafter "Miyoshi"), Ozawa (U.S. Patent 5,738,158), and Steenblock et al. (U.S. Patent 5,703,161; hereinafter "Steenblock"). Claim 7 is rejected under 35 U.SC. § 102(b) as being anticipated by Miyoshi. Claim 8 is rejected under 35 U.S.C. § 102(b) as being anticipated by Ozawa. Claims 9 and 10 are rejected under 35 U.S.§ 102(e) as being anticipated by Glans (U.S. Patent 5,900,471). Claim 14 is rejected under 35 U.S.C. § 102(b) as being anticipated by Hawkins (U.S. Patent 4,994,532). Claim 15 is rejected under 35 U.S.C. § 102(b) as being anticipated by Steenblock. Claim 11 is rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Rojstaczar (U.S. Patent 5,209,981). Claims 1-3, 5-6, 13, 33-35, 37-38, and 45 are rejected under 35 U.S.C. § 103(a) as being obvious over McGill et al. (U.S. Patent 5,880,552; hereinafter "McGill") in view of Litwin (U.S. Patent 6,056,805) and the article by Grate et al. (in Sensors and Actuators B (1991), 85-111; hereinafter "Grate"). The Applicants respectfully traverse all of these rejections for the reasons set forth below. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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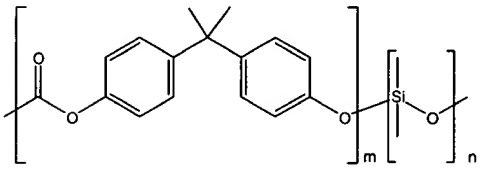
New claims 50-52 recite subject matter already disclosed in the specification and are patentable in view of the cited prior art. For example, a piezoelectric crystal sensor element is disclosed at lines 6-7 on page 6. The measurement of a change in oscillation frequency to relate to the amount of chemical in a medium adjacent to the sensor element is disclose at lines 24-26 on page 6. Therefore, early allowance of claims 50 and 51 is respectfully requested.

Objection to the Specification

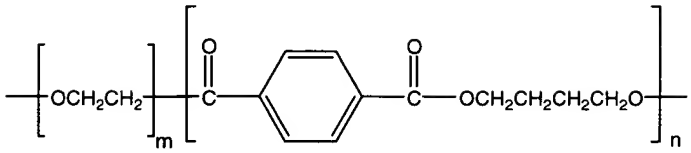
The disclosure is objected to because the Examiner alleges that the variables m, n, x, and y denoting the number of repeating units of the copolymer are not defined in the specification. The Applicants respectfully disagree with the Examiner because, these variables are easily ascertainable either directly or by calculations with the disclosed molecular weights from U.S. Patents 5,595,586; 5,391,300; 4,808,686; and 4,690,997 that are incorporated in the present disclosure by reference and other U.S. patents that are incorporated by reference in these U.S. patents. However, the specification has been amended to include the ranges of the variables m, n, p, x, y, and z at the appropriate places.

For the material



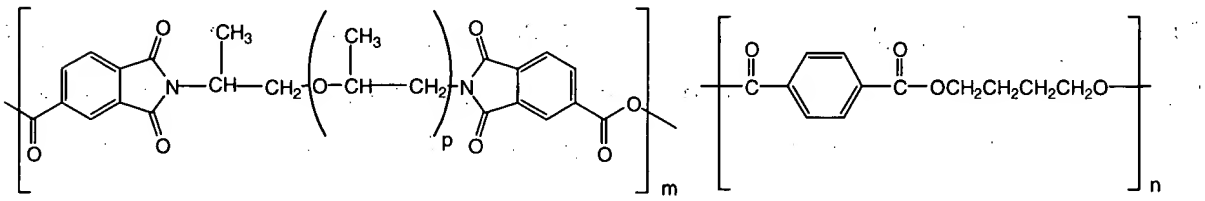
U.S. Patent 4,711,933 (incorporated by reference in U.S. Patent 5,595,586 that is, in turn, incorporated by reference in the present disclosure) gives the range for m from 1 to about 4, inclusive (column 2, lines 33-38). U.S. Patent 4,808,686 that is incorporated by reference in the present disclosure gives the range for n from about 3 to about 20, inclusive (column 2, line 50 and Table II).

For the material



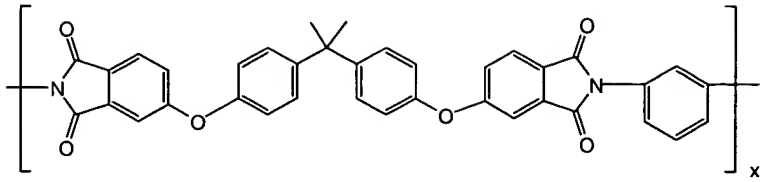
U.S. patent 4,556,705 (incorporated by reference in U.S. Patent 5,595,586 that is in turn incorporated by reference in the present disclosure) gives the range for m from about 10 to about 300, inclusive (column 4, lines 24-29). A calculation using information disclosed in U.S. Patent 5,595,586 at column 6, lines 14-15 gives the values for n in the range from about 5 to about 300, inclusive.

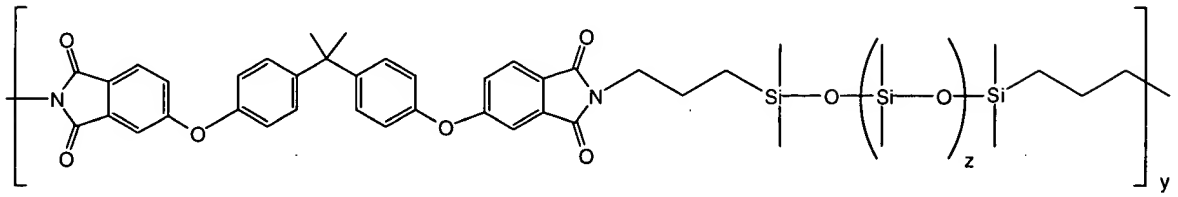
For the material



U.S. Patent 4,690,997 incorporated by reference in the present disclosure gives the range for m from 1 to about 60, inclusive (column 4, lines 11). U.S. Patent 4,556,705 (incorporated by reference by U.S. Patent 5,595,586 that is in turn incorporated by reference in the present disclosure) gives the range for p from about 10 to about 200, inclusive (column 4, lines 24-29).). A calculation using information disclosed in U.S. Patent 5,595,586 at column 6, lines 14-15 gives the values for n in the range from about 5 to about 300, inclusive.

For the material





U.S. Patent 4,690,997 incorporated by reference in the present disclosure gives the range for x from about 1 to about 60 (column 4, line 11) and the range for z from about 3 to about 20 (column 2, lines 50-52). U.S. Patent 4,808,686 incorporated by reference in the present disclosure gives the range for y from about 40 to about 65 (column 10, lines 34-36; molecular weight in the range from about 50,000 to about 80,000).

Therefore, the Applicants respectfully submit that the Examiner's objection to the present disclosure has been overcome.

Claim Rejection Under 35 U.S.C. § 112

Claims 5 and 37 are rejected under 35 U.S.C. § 112, first paragraph, because the word "partition" is ambiguous as to its intended meaning. Claims 5 and 37 have been amended to cure the alleged ambiguity of the word "partition" and are now believed to overcome the rejection.

Claims 14-17 and 46-49 are rejected under 35 U.S.C. § 112, first paragraph, because m, n, x, and y are not addressed. Claims 14-17 and 46-49 have been amended to include ranges for the variables m, n, p, x, y, and z. Therefore, these claims are now believed to overcome the Examiner's rejection.

Claims 33-49 are rejected under 35 U.S.C. § 112, first paragraph, because the meaning of "operation sensitivity" is not clear and receives no support from the specification. Claim 33 and, therefore, all claims dependent therefrom have been amended to cure the ambiguity of the phrase "operation sensitivity." These claims now recite a change in a characteristic response of the sensor element resulting from the capture of the target compound in the polymeric film. Such a characteristic response of the sensor element is fully disclosed in the present specification; e.g., an oscillation frequency characteristic of the particular sensor element. The Applicants respectfully submit that the phrase "characteristic response" fully meets the requirement of 35 U.S.C. § 112, first paragraph, because "[t]he subject matter of the claim need not be described literally (i.e., using the same terms or *in haec verba*) in order for the disclosure to satisfy the description requirement." MPEP § 2163.02 (Feb. 2000). Figures 15 and 16 of the present specification disclose the response of Siltem™-coated chemical sensors. Therefore, the Applicants respectfully submit that claims 33-49 now overcome the Examiner's rejection.

Claim 12 is rejected under 35 U.S.C. § 112, second paragraph, because, "[t]he claim, as written," is not clear and "is not in full agreement with the comparable description provided on page [8], lines 12-19 of the specification." Claim 12 has been amended to particularly recite and claim a sensor element comprising an AT-cut quartz crystal substrate. Claim 12 is also objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Claim 12 has also been rewritten in independent form to include all of the limitations of claim 1 upon which it was dependent. Therefore, claim 12 is now believed to be in condition for allowance. Early allowance of this claim is respectfully requested.

Claim Rejection Under 35 U.S.C. § 102

"Claims 1, 2, and 4 are rejected under 35 U.S.C. § 102(b) as being anticipated by Miyoshi et al., [ ], Ozawa, and Steenblock." (Emphasis added.) The

Applicants respectfully traverse this rejection because neither Miyoshi, nor Ozawa, nor Steenblock discloses each and every element of claims 1, 2, and 4.

Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclose in a single prior-art reference. *Akzo N.V. v. U.S. International Trade Commission*, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986). When more than one reference is required to established unpatentability of the claimed invention, anticipation under § 102 cannot be found, and validity is determined in terms of § 103. *Continental Can USA v. Monsanto Co.*, 20 U.S.P.Q.2d 1746, 1748 (Fed. Cir. 1991).

The anticipation rejection of claims 1, 2, and 4 was predicated on Miyoshi, Ozawa, and Steenblock is improper under the holding of *Continental Can USA*. Moreover, none of these references discloses a polymeric film disposed on a chemical sensor element, which polymeric film captures a quantity of a chemical and thereby induces a measurable change in a signal of the sensor element, as recited in claims 1, 2, and 4. Therefore, Miyoshi, Ozawa, or Steenblock does not anticipate these claims. Thus, claims 1, 2, and 4 are patentable over Miyoshi, Ozawa, or Steenblock.

Claim 7 is rejected under 35 U.S.C. § 102(b) as being anticipated by Miyoshi. The Applicants respectfully traverse this rejection because Miyoshi does not disclose each and every element of claim 7. Miyoshi discloses a solution composition of a polyester having hard and soft segments which may be cast on a support. However, Miyoshi does not disclose a polyester film disposed on a chemical sensor element, which polyester film captures a chemical compound and induces a change in a signal of the chemical sensor element. Therefore, Miyoshi does not anticipate claim 7.

Claim 8 is rejected under 35 U.S.C. § 102(b) as being anticipated by Ozawa. The Applicants respectfully traverse this rejection because Ozawa does not disclose

each and every element of claim 8. Ozawa discloses a thermoplastic polyester elastomer layer of a copolymer of polybutyleneterephthalate and polyoxyalkylene diimidediacid formed on a pneumatic tire to prevent air permeation therefrom. However, Ozawa does not disclose such a film of polyester on a chemical sensor element that induces a change in a signal of the sensor element when the film captures a quantity of a chemical compound, as recited in claim 8. Therefore, Ozawa does not anticipate claim 8.

Claims 9 and 10 are rejected under 35 U.S.C. § 102(e) as being anticipated by Glans. The Applicants respectfully traverse this rejection because Glans does not disclose each and every element of either claim 9 or 10. Glans discloses a blend of at least two polyetheramide copolymers, one having a predominantly hard polyamide segments and one having predominantly soft polyether segments, which polymer blends are used to form a film and attach to a textile fabric. However, Glans does not disclose a chemical sensor element having disposed thereon a polymeric film comprising a polyether polyamide, which polymeric film induces a change in a signal of the sensor element upon capturing a chemical compound, as recited in claims 9 and 10. Therefore, Glans does not anticipate these claims.

Claim 14 is rejected under 35 U.S.C. § 102(b) as being anticipated by Hawkins. The Applicants respectfully traverse this rejection because Hawkins does not disclose each and every element of claim 14. Hawkins discloses a method for preparing a polycarbonate-silicone block copolymer. However, Hawkins does not disclose a film of such a polymer disposed on a chemical sensor element to induce a change in the signal of the sensor element when a quantity of a chemical is captured in such a film, as recited in claim 14. Therefore, Hawkins does not anticipate claim 14.

Claim 15 is rejected under 35 U.S.C. § 102(b) as being anticipated by Steenblock. The Applicants respectfully traverse this rejection because Steenblock does not disclose each and every element of claim 15. As the Examiner admitted,

"[t]he focus of the Steenblock reference is the employment of a polyether/polyamide copolymer as water-repelling film." Steenblock does not disclose a film of a polyether/polycarbonate disposed on a chemical sensor element which induces a change in a signal of the sensor element when the polymeric film captures a quantity of a chemical, as recited in claim 15. Therefore, Steenblock does not anticipate claim 15.

Claim Rejection Under 35 U.S.C. § 103(a)

Claim 11 is rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as being obvious over Rojstaczar. The Applicants respectfully traverse this rejection because Rojstaczar does not disclose, teach, or suggest all of the elements of claim 11.

"Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." *Lindemann Maschinenfabrik GMMBH v. American Hoist & Derrick Co.*, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984) (Emphasis added.)

Rojstaczar discloses a method of making a polyimidesiloxane block copolymer. However, Rojstaczar does not disclose, teach, or suggest that a film of this polymer be disposed on a chemical sensor element and that such a polymeric film would have enough capturing capacity for chemical compounds so to induce a change in a signal of the sensor element, as recited in claim 11.

"[T]he legal conclusion of obviousness requires that there be some suggestion, motivation, or teaching in the prior art whereby a person of ordinary skill would have selected the components that the inventor selected and used them to make the new device." *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 US.P.Q.2d 1225, 1231-32 (Fed. Cir. 1998).

Rojstaczar never mentions or even remotely hints that a film of polyimidesiloxane should be disposed on a chemical sensor element and that such a film would have enough capturing capacity so to induce a measurable change in a signal produced by the sensor element, as recited in claim 11. Since Rojstaczar does not provide suggestion, or motivation for making a chemical sensor having the elements recited in claim 11, Rojstaczar cannot render claim 11 obvious.

Claims 1-3, 5-6, 13, 33-35, 37-38, and 45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over McGill in view of Litwin and Grate. The Applicants respectfully traverse this rejection because a combination of McGill, Litwin, and Grate does not disclose, teach, or suggests or provides a motivation to make the chemical sensor having the elements recited in these claims.

"[T]he legal conclusion of obviousness requires that there be some suggestion, motivation, or teaching in the prior art whereby a person of ordinary skill would have selected the components that the inventor selected and used them to make the new device." *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 US.P.Q.2d 1225, 1231-32 (Fed. Cir. 1998). "[I]t is insufficient that prior art shows similar components, unless it also contains some teaching, suggestion, or incentive for arriving at the claimed invention." *Northern Telecom, Inc. v. Datapoint Corp.*, 15 U.S.P.Q.2d 1321, 1323 (Fed. Cir. 1990). "Determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the [claimed] invention. There must be a teaching or suggestion within the prior art." *ATD Corporation v. Lydall, Inc.*, 48 U.S.P.Q.2d 1321, 1329 (Fed. Cir. 1998). Moreover, doing what those skilled in the art suggested should not be done is strongly probative of nonobviousness. *Kloster Speedsteel AB v. Crucible, Inc.*, 230 U.S.P.Q. 81, 86 (Fed. Cir. 1986).

McGill discloses a chemical or biochemical sensor transducer provided with a protective coating of diamond or diamond-like carbon between the transducer and a chemoselective or bioselective layer. McGill particularly teaches away from

disposing a nonpolar chemoselective layer directly on the transducer, specifically a quartz waveguide, because this configuration resulted in a loss of sensor response. Column 5, lines 26-38. In addition, the Examiner even admitted that "McGill does not disclose the utilization of a film having simultaneously hard and soft domains." On the contrary, the chemical sensor recited in claims 1-3, 5-6, 13, 33-35, 37-38, and 45 has a nonpolar polymeric film comprising hard and soft domains, which film is disposed directly on the sensor element (i.e., the sensor does not have an intervening diamond or diamond-like layer). Thus, McGill teaches away from the general configuration of the chemical sensor and method of the present invention, as recited in claims 1-3, 5-6, 13, 33-35, 37-38, and 45. Therefore, McGill cannot be properly combined with any other reference to render obvious claims 1-3, 5-6, 13, 33-35, 37-38, and 45.

Litwin discloses an absorption of nonpolar organic molecules using absorbents comprised of a soft polymer of a polydiene or a poly(lower-alkylene) (i.e., a polymer that consists of only C and H, and nothing else) and a hard crystalline polymer of polystyrene or other crystalline polymers. Litwin specifically states that not all block copolymers could be employed as absorbents. Column 4, lines 41-43. Nowhere does Litwin suggest that even his limited range of polymers should be used in any way as a sensor to quantitatively determine the amount of chemical outside a polymer of his invention. It is known that some polymers absorb hydrocarbons, such as solvents; but it does not follow that a teaching such as Litwin may be combined with McGill when such a combination is not taught or suggested in these references. McGill does not teach or suggest a polymer having hard and soft domains, and Litwin does not teach or suggest a chemical sensor. Therefore, a combination of McGill and Litwin does not render obvious claims 1-3, 5-6, 13, 33-35, 37-38, and 45.

Grate discusses the factors influencing the properties of sorbent coatings for chemical sensors. Grate mentions factors such as solubility interaction between polymers and vapors, sorption properties, linear solvation energy relationship,

polymer glass transition temperature. However, nowhere does Grate suggest the usefulness of copolymers having hard and soft domains. Grate is in favor of a soft polymer. For example, Grate's Figure 4 shows the types of useful polymers which are polymers having only one type of repeating units. Grate specifically teaches away from partially crystalline polymers; i.e., those having both hard and soft domains (p. 96). On the contrary, the present claims 1-3, 5-6, 13, 33-35, 37-38, and 45 recite polymers having both soft and hard blocks or domains. Therefore, Grate cannot be combined with McGill to arrive at claims 1-3, 5-6, 13, 33-35, 37-38, and 45. Moreover, in view of the teaching away by Grate of the use of polymers having hard domains in sensor coating design, which teaching is completely contradictory to the teaching of Litwin in hydrocarbon absorption, Grate and Litwin cannot be combined with McGill to arrive at claims 1-3, 5-6, 13, 33-35, 37-38, and 45. Therefore, claims 1-3, 5-6, 13, 33-35, 37-38, and 45 are patentable over McGill in view of Litwin and Grate.

The Examiner asserted that an equilibrium between polymer sorbent and gaseous environment is known and is applicable to claims 5 and 37 and that the known principle of "like dissolves like" are applicable to claims 13 and 45. The Applicants respectfully disagree that such principles would render obvious these claims because general scientific principles cannot render obvious inventions using those scientific principles absent any teaching or suggestion for putting to use such principle in the claimed inventions. Section 103(a) speaks of the invention "as a whole," and not the features or working principles of the invention. 35 U.S.C. § 103(a) (2001). All inventions must embody one scientific principle or another, but scientific principles do not by themselves render obvious a claimed invention embodying the scientific principles. The invention as whole, with all of its limitations, must be taught or suggested by the prior art. Here, the cited prior-art references cannot be reconciled because of their contradictory teachings to arrive at the claimed invention as recited in claims 5, 13, 37, and 45. Therefore, the cited references cannot render obvious these claims.

In view of the above, it is submitted that the claims are patentable and in condition for allowance. Reconsideration of the rejection is requested. Allowance of claims at an early date is solicited.

Respectfully submitted,

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